

Name: \_\_\_\_\_KEY\_\_\_\_\_

**FINAL EXAM** **FRIDAY, DECEMBER 21, 2007**  
**ORGANIC CHEMISTRY II** **4:122**

Instructions: Print your name in the spaces provided on every sheet of the exam. Failure to do so will lead to loss of credit.

Make sure that you do the problems on the front and back of every sheet.

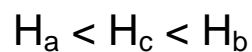
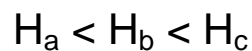
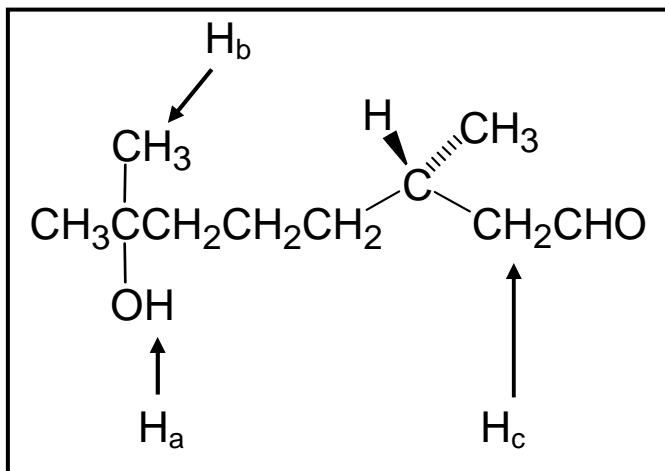
On multiple choice questions, clearly circle the answer that you think is correct.

Question #	Possible Points	Point Scored
1	30	_____
2	14	_____
3	8	_____
4	8	_____
5	32	_____
6	8	_____
	_____	
	100	

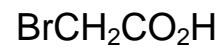
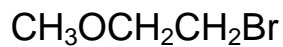
**TOTAL**

1. Multiple Choice Questions. Clearly circle your chosen answer. (30 points; 3 apiece)  
**ANSWERS ARE SHOWN IN RED**

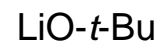
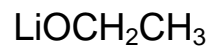
- a) Rank the labeled protons in the following compound in order of increasing acidity.  
 (Problem 23.6, p 838)



- b) Which alkyl halide is used to prepare  $\text{CH}_3\text{OCH}_2\text{CH}_2\text{CO}_2\text{H}$  by a malonic ester synthesis?  
 (Problem 23.41a, p 861)

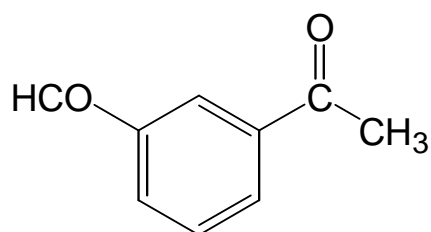
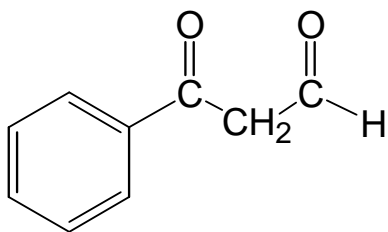
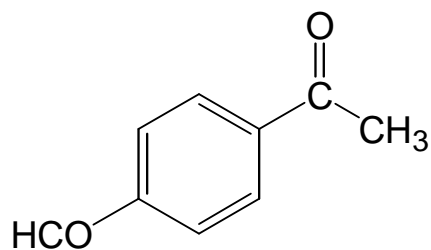
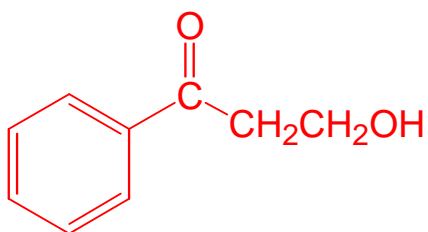


- c) Which base converts diisopropylamine quantitatively into lithium diisopropylamide  
 (LDA; Chapter 23, p 840)?

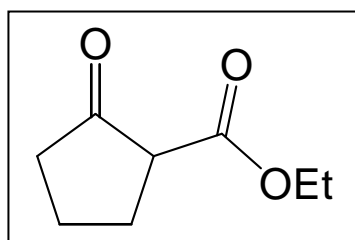


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- d) What product is formed from the crossed aldol reaction of  $\text{C}_6\text{H}_5\text{COCH}_3$  and  $\text{CH}_2=\text{O}$ ?  
Problem 24.5b, p 870



- e) What diester gives the product in the box by a Dieckmann reaction?



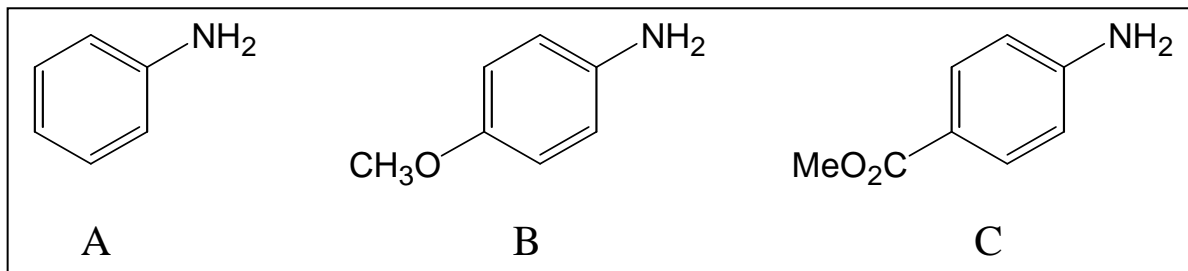
diethyl malonate

**diethyl hexanedioate**

diethyl succinate

diethyl heptanedioate

f) Rank the compounds in the box in order of increasing basicity. (Problem 25.25a, p 914)



$A < B < C$

$B < C < A$

$C < B < A$

$C < A < B$

g) Which alkyl halide is used to prepare 2-pentanone by an acetoacetic ester synthesis?  
(Problem 23.26a, p 857)

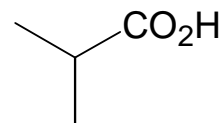
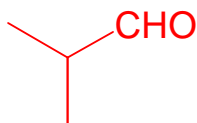
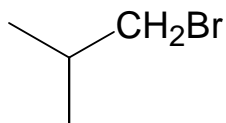
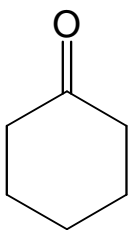
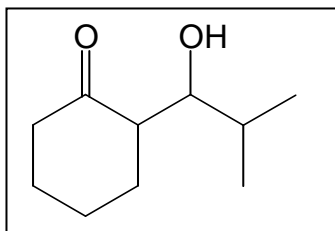
$\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$

$\text{CH}_3\text{I}$

$\text{CH}_3\text{CH}_2\text{Br}$

$\text{CH}_3\text{COCH}_2\text{Br}$

h) Which electrophile is used to prepare the product in the box by a directed Aldol reaction?  
(Problem 24.8a, p 873)



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- i) Which reagent converts  $C_6H_5CH_2CH_2CH_2NO_2$  into  $C_6H_5CH_2CH_2CH_2NH_2$ ?  
(Problem 25.52c, p 936)

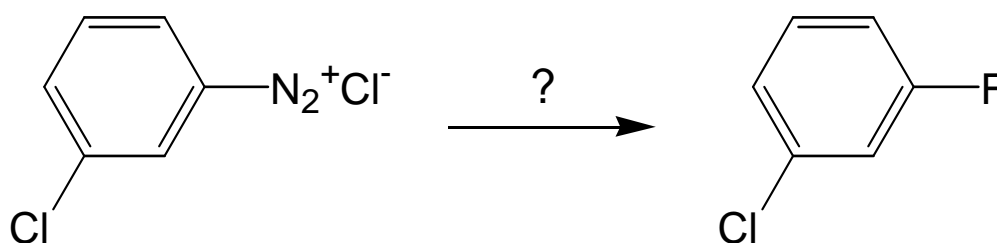
$H_3O^+$

$NaBH_4$

**$H_2, Pd/C$**

$NaNH_2$

- j) Which reagent is used to complete the following reaction? (Problem 25.65f, p 938)



**$BF_3$**

$Bu_4N^+F^-$

$F_2$

$CuF$

2. Comparison Questions. Clearly circle your chosen answer. (14 points; 2 apiece)

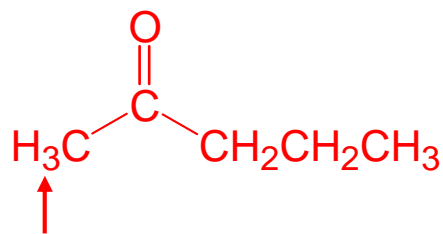
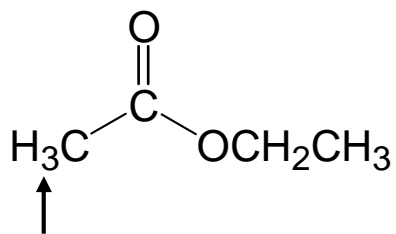
**ANSWERS ARE SHOWN IN RED**

- a) Which order of reagents will convert 2-pentanone into 4-methyl-3-hexanone in the best yield? (Problem 23.18d, p 850)

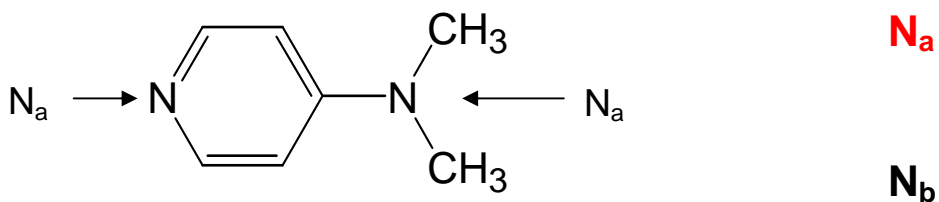
- 1) LDA in THF,  $-78\text{ }^\circ\text{C}$
- 2)  $CH_3I$
- 3) NaOEt in EtOH,  $25\text{ }^\circ\text{C}$
- 4)  $CH_3I$

- 1) NaOEt in EtOH,  $25\text{ }^\circ\text{C}$**
- 2)  $CH_3I$**
- 3) LDA in THF,  $-78\text{ }^\circ\text{C}$**
- 4)  $CH_3I$**

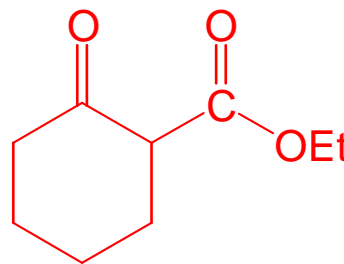
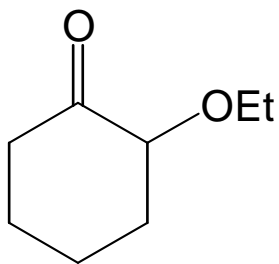
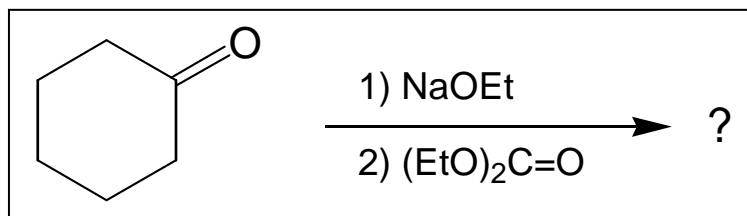
b) The indicated protons of which compound are more acidic? (Problem 23.36, p 860)



c) Which nitrogen in DMAP is more basic? (Problem 25.27a, p 916)

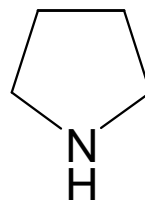
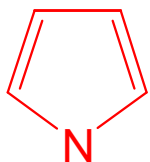


d) What is the product of the following reaction? (Problem 24.15a, p 879)

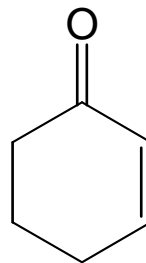
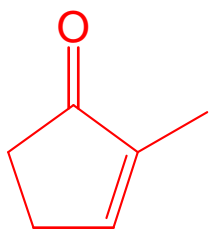
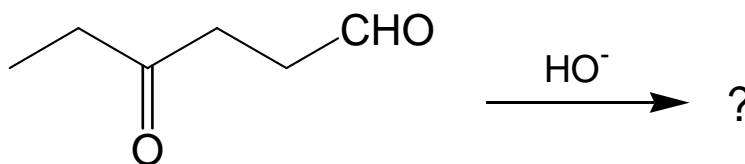


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e) Which compound is pyrrole? (Chapter 25, p 897)



f) What product is formed when the following compound undergoes an intramolecular aldol reaction followed by dehydration? (Chapter 24.26a, p 887)



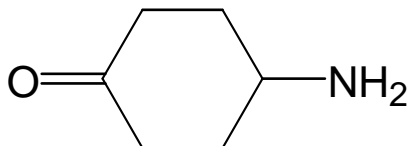
g) Organic Chemistry II is good preparation for a career in which field?

**medicine**

**comedy**

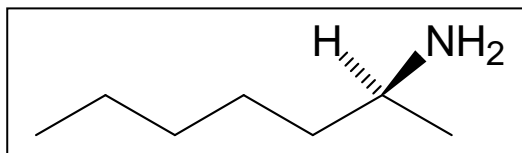
3. Draw the structure or provide the name of the following compounds. (8 points; 4 apiece)

a) Name the following compound. (Problem 25.43h, p 935)



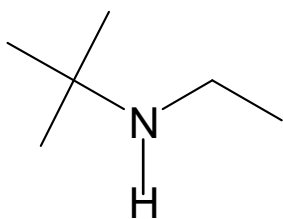
**4-aminocyclohexanone**

b) Draw the structure of (*S*)-2-heptanamine. (Problem 25.44j, p 935)



4. Structures from Spectroscopic Data (8 points; 4 apiece)

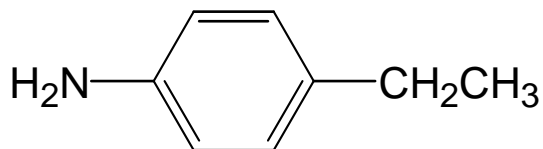
a) What is the structure of a compound  $C_6H_{15}N$  that gives the following  $^1H$  NMR data: 0.9 ppm (singlet, 1H); 1.10 ppm (triplet, 3H); 1.15 ppm (singlet, 9H); 2.6 ppm (quartet, 2H)? (Problem 25.10, p 899)



*t*-butylethylamine

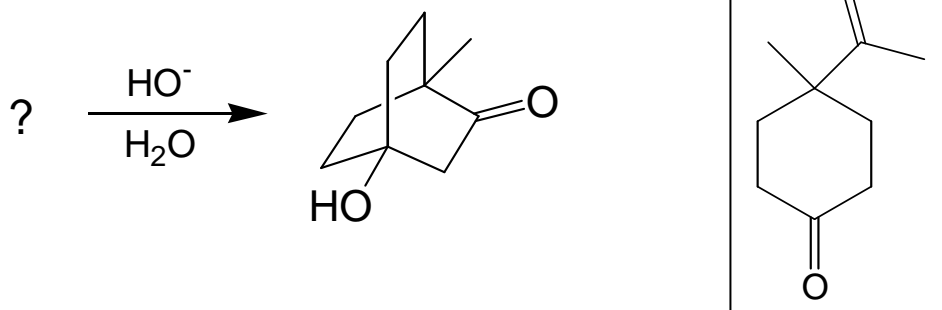
b) A compound  $C_8H_{11}N$  has IR peaks at  $3430\text{ cm}^{-1}$  and  $3350\text{ cm}^{-1}$  and gives the following  $^1H$  NMR data. What is the structure of this compound? (Problem 25.76c, pp 1001)

1.2 ppm (triplet, 3H); 2.55 ppm (quartet, 2H); 3.6 ppm (singlet, 2H); 6.65 ppm (doublet, 2H); 7.0 ppm (doublet, 2H)

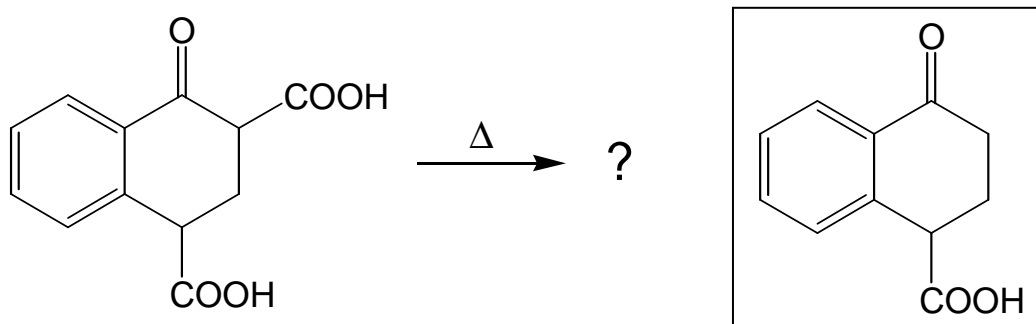




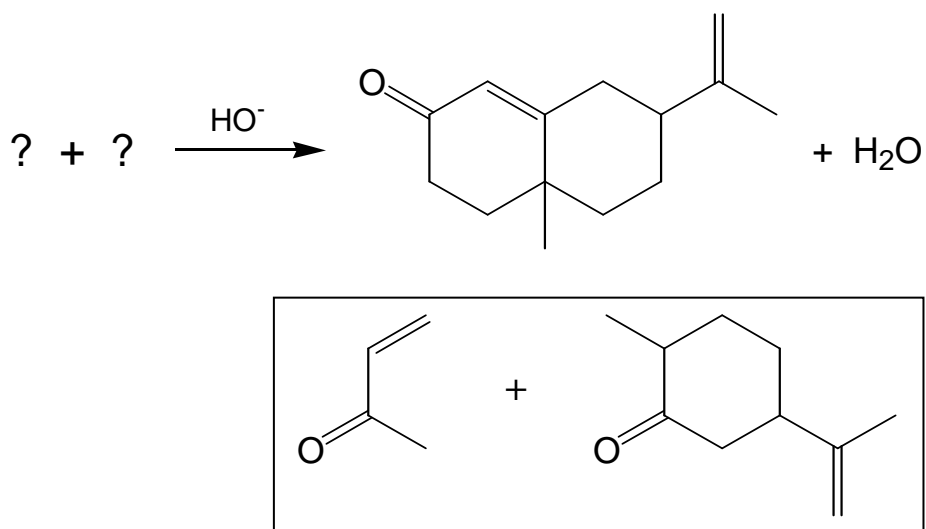
d) Problem 24.28d, p 887



e) Problem 23.47b, p 861

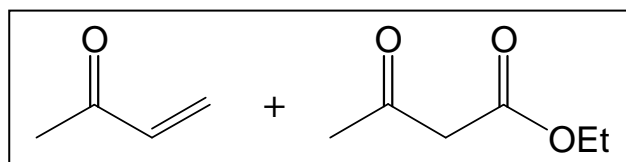
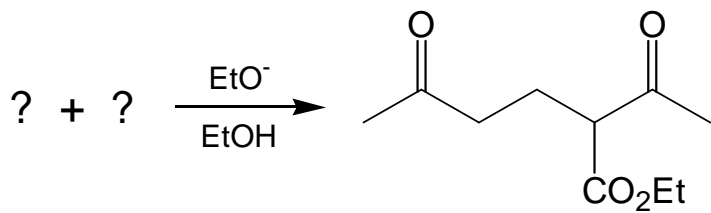


f) Problem 24.22b, p 885 (Robinson annulation)

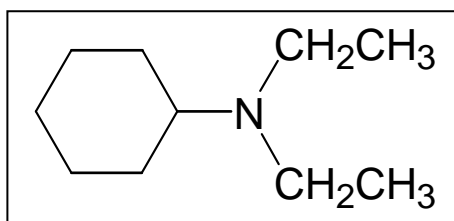
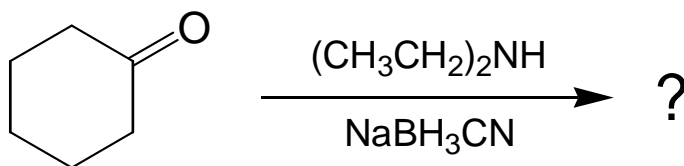


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g) Problem 24.20a, p 882 (Michael reaction)



h) Problem 25.18c, p 907



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6. Devise a synthesis of 1,3,5-trichlorobenzene from benzene. (Problem 25.37d, p 928; 8 points)

